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ABSTRACT

A study of the effects of pictures and context cues in teaching sight word vocabulary used six high ability and six low ability first grade students for each of four experimental conditions: word alone, picture, sentence with no picture (context), and sentence plus picture. The procedures included acquisition and test trials, a retention test immediately following the trials, and a delayed retention test (24 hours later). In the analysis of variance for acquisition trials, ability level was the only significant factor, with high ability children learning words in fewer trials. There were no significant differences in the immediate retention test data, because all the children responded perfectly. The analysis of variance for the delayed retention test revealed a significant picture by context by ability interaction. This pattern of interaction showed perfect retention by children of high ability for combinations of pictures and context, and differences among combinations of pictures and context for children of low ability. In this pattern, the low ability students had more correct responses when pictures alone were present and when context cues alone were present than when no pictures and no context cues were present. (Author/RL)

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THE EFFECT OF PICTURES AND CONTEXT CUES ON THE ACQUISITION AND RETENTION OF SIGHT WORDS

AN ABSTRACT OF A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS

THE STATE UNIVERSITY OF NEW JERSEY

BY

CHRISTINE P. DOANE

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

COMMITTEE CHAIRPERSON: Martin Kling, Ph.D.

NEW BRUNSWICK, NEW JERSEY JANUARY, 1979

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ABSTRACT

An investigation similar to that of Singer, Samuels, and Spiroff (1973-74) was conducted testing the effectiveness of pictures and context cues in teaching sight word vocabulary. Forty-eight first-graders from three classrooms at the Irene E. Feldkirchner Elementary School, an upper-middle-class suburban school in Green Brook, New Jersey, served as subjects in the tenth month of the school year. All children were individually pretested with 20 words. Children were included in the study if they could not read at least four of the 20 words presented in the pretest. A median level of composite scores (comprehension, vocabulary) from the Gates MacGinitie Reading Test was determined; the subjects were divided into high and low ability groups. The subjects were then assigned to one of four experimental conditions: word alone, picture, sentence-no-picture, and sentence plus picture. Two children of high ability and two children of low ability from each classroom were randomly assigned to each experimental condition.

Each subject was trained to read four words taken from the list of 20 words presented in the pretest. The word alone group saw words only; the picture group saw words and pictures; the

sentence-no-picture group saw words within the context of a sentence; and the sentence plus picture group saw words embedded in the context of a sentence with a picture. Using four different words which the child could not read as shown on the pretest, each subject received acquisition and test trials. An immediate retention test on the four words directly followed the acquisition and test trials. After 24 hours each subject was again tested on the four words learned during acquisition and test trials.

Three separate four-way analyses of variance were computed; one for acquisition trials, one for the number of words correct on the immediate retention test, and one for the number of words correct on the delayed retention test. In the analysis of variance for acquisition trials with pictures, context, and ability level as variables, the only significant F found was for ability ($p \leq .05$). Children of high ability ($\bar{X}=1.062$) learned the words in fewer trials than children of low ability ($\bar{X}=1.260$). There were no significant differences among means for number of words correct on the immediate retention test. All children of all combinations of pictures, context, and ability responded perfectly, achieving a mean score of 4.00.

The analysis of variance for number of words correct on the delayed retention test revealed a

significant picture by context by ability interaction. This pattern of interaction was one of perfect retention by children of high ability for combinations of pictures and context ($\bar{X}$=4.00) with differences among combinations of pictures and context for children of low ability. From this pattern it was demonstrated that for low ability children pictures were most effective when used alone without the presence of context; context cues were most helpful when pictures were not present. A greater number of correct responses were made when pictures alone were present and when context cues alone were present than when no pictures and no context cues were present.

The following conclusions were drawn:

1. The use of pictures does not distract children from learning sight words.

2. The use of context cues does not distract children from learning sight words.

3. Rate of learning tended to be slower for children of low ability.

4. Retention of words was greater for children of high ability than for children of low ability.

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CHAPTER I

INTRODUCTION

The ability to recognize printed words is basic to the total reading process. There are, however, points of controversy concerning how initial reading vocabulary should best be taught in beginning reading instruction.

Children are helped by their teachers to learn new words in various ways. A word may be presented by itself, or in connection with a picture. Another procedure is to present the word within the context of a sentence. The word may also be introduced in a sentence accompanied by a picture. Evidence regarding the effectiveness of each of these procedures on the acquisition of reading responses is contradictory. The purpose of this study was to investigate the role of pictures and context clues in teaching sight word vocabulary.

Background of the Problem

Pictures

Historically, children have been taught to read from books containing pictures (Samuels, 1970). In America, the practice of incorporating pictures with text began with the New England Primer in 1729.

Today nearly all primary basal reading series contain illustrations. One exception is the absence of pictures in a beginning reading series called Let's Read by Bloomfield and Barnhart (1963, in Chall, 1967).

Due to the extensive use of pictures in materials used to teach reading, researchers have become concerned with their effectiveness. Educators have expressed views for and against the value of using pictures in teaching sight vocabulary.

> The use of pictures as clues to word identification is most appropriate during the beginning stages of reading. Pictures provide interesting and attractive media with which to work, and they offer the child valuable assistance in making the transition from recognizing an object and naming it to recognizing a symbol which stands for an object and naming it. (Smith, 1963, p. 168)

Illustrations may stimulate interest, facilitate comprehension, and serve as aids to word recognition (Betts, 1957).

Contrary to these views, arguments against the value of using pictures in acquiring a sight vocabulary have been expressed. Braun (1969) found that pictures tended to compete with words for the reader's attention.

Although Dechant (1964) pointed out that children are frequently introduced to the meaning of a word through the use of pictures, and that pictures are clues to the story, he also expressed concern for the extensive use of pictures in most preprimer and primer

material. "Reading perhaps too often becomes an exercise in picture reading rather than identification and understanding of the word" (Dechant, 1964, p. 205).

In two experiments testing the effect of pictures on the acquisition of reading responses, Samuels (1967) found that pictures functioned as distracting stimuli by drawing attention away from the printed words.

Context

Reading authorities have agreed to the importance of context cues in identifying words. There has also been wide acceptance in the value of teaching children to utilize context cues in their reading.

The use of context cues can aid the reader in word recognition and analysis (Harris & Sipay, 1975). A minimum amount of visual input is needed to determine an unknown word if the context offers strong clues as to what the word probably is.

Research has also demonstrated that the use of context facilitates word recognition. Goodman (1965) found that children were able to read more words in the context of a sentence than when the same words were presented in isolation.

In contrast to evidence proving the effectiveness of context in word recognition, studies have also

shown negative effects of using context in acquiring reading responses. Results of an experiment by Singer, Samuels and Spiroff (1973-74), demonstrated that children best learned reading responses when words were presented alone.

In view of the controversial evidence concerning the use of pictures and context cues in word recognition, the question regarding what instructional conditions best help a child acquire a sight word vocabulary still remains unanswered.

Statement of the Problem

The present study was designed to explore the following questions:

1. When words and pictures are presented together, do pictures act as distracting or facilitating stimuli in the acquisition and retention of sight words?
2. When words are presented with the aid of context cues, do context cues act as distracting or facilitating stimuli in the acquisition and retention of sight words?
3. When words are presented with pictures and with the aid of context cues, do pictures and context cues act as distracting or facilitating stimuli in the acquisition and

retention of sight words?

4. What effect will ability have on the acquisition and retention of sight words across the four treatments?
5. What effect will the teacher have on the acquisition and retention of sight words across the four treatments?

Hypotheses

Hypothesis 1. During acquisition trials, the use of pictures will produce significantly more correct reading responses than the use of words alone.

Hypothesis 2. On the immediate retention test, the use of pictures will produce significantly more correct reading responses than the use of words alone.

Hypothesis 3. After a delayed time period, the picture group will retain more correct reading responses than the word alone group.

Hypothesis 4. During the acquisition trials, the use of context cues will produce significantly more correct reading responses than the use of words alone.

Hypothesis 5. On the immediate retention test, the use of context cues will produce significantly more correct reading responses than the use of words alone.

Hypothesis 6. After a delayed time period, the sentence-no-picture group will retain more correct

reading responses than the word alone group.

Hypothesis 7. During the acquisition trials, the use of pictures and context cues will produce significantly more correct reading responses than the use of words alone.

Hypothesis 8. On the immediate retention test, the use of pictures and context cues will produce significiantly more correct reading responses than the use of words alone.

Hypothesis 9. After a delayed time period, the sentence plus picture group will retain more correct reading responses than the word alone group.

Hypothesis 10. There will be no effect upon the differential results among treatment groups for the acquisition trials due to ability level.

Hypothesis 11. There will be no effect upon the differential results among treatment groups for the immediate retention test due to ability level.

Hypothesis 12. There will be no effect upon the differential results among treatment groups for the delayed retention test due to ability level.

Hypothesis 13. There will be no effect upon the differential results among treatment groups for the acquisition trials due to the teacher factor.

Hypothesis 14. There will be no effect upon the differential results among treatment groups for the

immediate retention test due to the teacher factor.

Hypothesis 15. There will be no effect upon the differential results among treatment groups for the delayed retention test due to the teacher factor.

Importance of the Study

In light of the diverse viewpoints regarding the use of pictures and context cues in teaching word recognition, it is evident that further investigation is needed to determine their effectiveness in beginning reading instruction.

A variety of approaches to teaching beginning reading with differing theoretical bases are currently being used. Teachers are continually concerned about which method will be most successful in teaching their students to read.

In regard to the teaching of initial reading vocabulary, a word may be presented in different ways. It may be presented alone, with a picture, within the context of a sentence, or in a combination of context plus a picture. Determining what instructional conditions are most effective in teaching sight word vocabulary is the key issue of this study. Do pictures aid the child in acquiring reading responses by creating meaningful associations, which are transferred and later enable the child to read words in isolation?

Does the context of a sentence aid the child in acquiring reading responses, since the syntactic and semantic constraints of the sentences provide cues for anticipating unknown words? In contrast, do pictures and context cues act as distracting stimuli for directing attention away from the printed word? Should words be presented in isolation, thereby forcing the child to pay attention to the graphic stimuli present in the printed word?

The results of this investigation will contribute to the body of literature already available concerning the use of pictures and context cues in beginning reading instruction. In addition some further insight into these controversial questions may be forthcoming.

Definition of Terms

For the purposes of this study, the following definitions of terms will be applied:

Acquisition: Acquisition refers to the stage in learning in which a new response is learned and gradually strengthened through repeated trials.

Feedback: If a correct reading response is not given within the allotted time during acquisition trials, the investigator will provide the correct response as feedback for the reader.

Context: Context refers to the syntactic and semantic cues available within a sentence for the identification of an unknown word.

Response: A response refers to an instance of observable behavior (i.e. the child's reading response to a word).

Retention: Retention refers to the number of previously learned words that are remembered after a delayed time period of approximately 24 hours.

Semantic Cue: Semantic cue refers to the aid that the meaning of known words in a sentence offers the reader when trying to identify an unknown word.

Sight Vocabulary: A sight vocabulary is composed of those words which can be recognized instantly without the aid of word analysis techniques.

Stimuli: The stimuli are the words, pictures, and sentences which create an occasion for a reading response. (See Appendixes A, B, C for further information.)

Syntactic Cue: Syntactic cue refers to the aid that the order and word class of the known words in a sentence offers a reader when trying to identify an unknown word.

Syntax: Syntax refers to the arrangement of words in a sentence, and the way in which each word relates to the others.

Trials Through Criterion: Trials through criterion refers to the number of trials necessary to acquire the correct reading response to the printed word.

Limitations

The findings of this study are limited in their application based upon the following conditions:

1. The findings of this study are applicable only to classes of first grade students in a similar school environment and exposed to the same conditions as those of the study.
2. The results of this study are valid only with students who receive the same amount and type of training as the students in this study.

CHAPTER II

REVIEW OF THE LITERATURE

The review of literature that follows is divided into two major sections: Pictures, Context Cues. Each major section is further subdivided into the following categories: Positive Effects, Negative Effects, Neither Positive Nor Negative Effects.

Pictures

Positive Effects

Pictures are one kind of context clue that may contribute to the meaning of a story or episode (Tinker & McCullough, 1962). A picture may give clues to the objects named in a story and to the actions taking place in the story and therefore, may aid the beginning reader in identifying new words in the printed text.

By presenting a new word in connection with a picture, the child may associate meaning with the printed word (Harris & Sipay, 1975). Gray (1948) also maintained that strong meaningful associations are established when printed words are introduced as labels for objects and pictures in the classroom. Singer (1971, in Dawson, comp.) discussed the principles of teaching word recognition and suggested a sequence

where the child proceeds from the familiar to the unfamiliar (1) learning names for actual objects, (2) associating a name with a picture of an object, (3) recognizing the printed word in conjunction with a picture, (4) recognizing the word alone.

Various activities with pictures such as matching words and pictures, illustrating words for a booklet, using sets of word-picture cards, and using picture dictionaries have been suggested in teaching and reinforcing sight words (Do Boer & Dallman, 1970). Russell (1961) stated that picture cards may be used by teachers several times until recognition of the word symbol alone is possible.

Reading, to a large extent, is converting abstract symbols into mental pictures (Porter, 1968). In learning to form mental pictures of what is read, activities which guide children in interpreting pictures and gaining information from pictures are valuable. For children who have difficulty comprehending what they read, it is also helpful to use pictures or objects whenever possible in presenting new words throughout the elementary grades.

Studies have substantiated these views concerning the positive effects of pictures in teaching reading.

In order to compare the effectiveness of using different sensory cues and combinations of cues in teaching sight words, 210 kindergarteners were randomly assigned to five training procedures: (1) word and picture, (2) auditory, (3) picture and auditory, (4) auditory and echoic response (response by subject), (5) picture, auditory and echoic response (King & Muehl, 1965). Children in each method read similar words (doll, bell, ball, bowl) and dissimilar words (gate, drum, nest, fork). The picture method was the most efficient in learning similar words; the auditory method facilitated the learning of dissimilar words. The pictures had neither a positive nor a negative effect in learning dissimilar words. Since many words look similar to a beginning reader, the additional cues provided by pictures, may aid the reader in learning new words. Furthermore King and Muehl suggested that pictures be used in teaching sight words in beginning reading.

Samuels (1970) claimed that conclusions reached by King and Muehl (1965) were valid only when the procedure used in their study is followed. In the word and picture method, attention was drawn to the printed word, by covering the picture after two seconds of exposure and instructing the child to look at the printed word. In a normal classroom situation, Samuels

(1970) notes, the picture is not covered and no one reminds the child to pay attention to the printed word.

Twenty-seven emotionally and mentally retarded students drawn from a rural area participated in a study designed to investigate the effects of pictorial representations of words on the acquisition of a sight vocabulary (Luyben & Brown, 1973). Subjects were randomly assigned to one of two experimental groups: (1) Word-Word Matching Group, (2) Word-Picture Matching Group. An IBM computer system presented each of 30 lessons and recorded student responses. The addition of pictures aided the acquisition of a sight vocabulary.

With 63 undergraduate students, Snowman and Cunningham (1974) demonstrated the superiority of pictures as adjunct aids over written adjunct aids as measured by reading performance.

Rohwer, Lynch, Levin, and Suzuki (1967) tested the association between gradations in learning efficiency and the form class of context connectives (preposition, conjunction, verb) on the acquisition of paired associates in both pictorial and printed form. The study attempted to determine whether or not the superiority of illustrations would decrease with age over an interval in which verbal facility presumably increases. Each of the 96 third and 96 sixth grade children

undertook to learn a list of 24 pairs of either pictures of objects or printed names of objects and were asked to learn the pairs so that when shown the first member of a pair, the second was recalled. Presentation involved one of four kinds of verbalizations: (1) names of objects, (2) names of objects connected by a conjunction, (3) names of objects connected by a preposition, (4) names of objects connected by a verb. The pictorial materials were superior to printed materials for both the older and younger subjects. Also presentation of noun pairs with verb connectives facilitated acquisition. Finally more learning occurred with verb connectives than with prepositions; and prepositions in turn were superior to the conjunctions.

Investigations of verbal learning have studied group effects using various stimulus materials; a small number of investigations have studies individual effects (Levin, Rohwer, & Cleary, 1971). In order to examine individual stimulus preferences in learning (verbal vs. pictorial), a paired associate task was designed in which the stimulus materials consisted of pairs of familiar objects presented in verbal and pictorial form. The subjects for the study were 288 children from kindergarten, first and third grades. Recall of the pictorial, unlabeled pairs was generally greater

than recall of verbal pairs. However, substantial individual differences were also shown, in that several children exhibited a verbal preference.

A study was designed to compare the effects of seeing pictures or words in a recognition task (Jenkins, Neale, & Deno, 1967). The 120 college sophomores participating in the study were randomly assigned to four treatment conditions as follows: (1) seeing pictures-recognizing pictures (PP), (2) seeing words-recognizing words (WW), (3) seeing pictures-recognizing words (PW), (4) seeing words-recognizing pictures (WP). According to each condition, 17 stimuli in the learning list were flashed onto a screen; the subjects were asked to remember what they had seen. Following this original presentation, one longer series of stimuli were flashed on the screen. The subjects were asked to rate each word or picture, according to the condition, on whether or not it was present in the original list. In comparing the performance of the PW group and the WW group, results demonstrated that the means of the two groups were highly similar. From this information, it was pointed out that the word labels of pictures are as easily recognized as the words themselves.

In their review of studies of prose learning in which the role of pictures has been examined, Levin and Lesgold (1977) presented evidence clearly

demonstrating the positive effect of pictures. Experiments reviewed included studies in which (1) the prose passages were presented orally, (2) the subjects were children, (3) the passages were fictional narratives, (4) pictures overlapped the story content, and (5) learning was demonstrated by factual recall. Evidence showed that positive effects of pictures can be generalized across a number of situational variables, including methods of presentation and testing. In addition, the studies demonstrated that children of varying characteristics benefitted from pictures in prose learning.

Negative Effects

Samuels (1967) conducted two experiments in order to test the effect of pictures on the acquisition of reading responses. For the laboratory experiment, Experiment I, 30 pre-first graders were randomly assigned to one of three conditions: no picture, simple picture, or complex picture. In the no picture condition the sight words to be learned (boy, bed, man, car) were typed on 5x8 inch index cards; one word was typed on each card. In the simple-picture condition, a simple black and white drawing portraying the object that the word symbolized appeared with the typed word. In the complex-picture condition, a word in addition

to a colored illustration was shown. Ten acquisition trials were alternated with 10 test trials on each word. The results showed that during the acquisition trials, the children in the picture group gave significantly more correct responses than children in the no-picture group. When pictures were not present during the test trials, however, the children in the no-picture group gave significantly more correct responses.

In laboratory Experiment II, Samuels (1967) used a procedure similar to that used in an actual classroom. Fifty-two first graders were divided into two matched groups under a picture or no-picture condition. After being pretested on 50 words used in a story, the subjects were given instruction in reading the story. The story appeared with an illustration in the picture condition; no picture appeared with the story in the no-picture condition. Following reading instruction, a posttest was administered to each subject on the same 50 words given in the pretest. Among the poorer readers, children in the no-picture condition learned to read significantly more words than children in the picture condition. Among the better readers, no significant difference in words acquired was found between the picture and the no-picture condition. Samuels proposed that the pictures directed

attention away from the printed words. In light of the results of the two experiments, he questioned the practice of putting pictures in reading primers.

In a recent article, Montare (1977) attempted to study the associative learning processes occurring in each of Samuels' (1967) experiments as a function of the classical conditioning paradigm. He concluded that neither of Samuels' (1967) experiments were proper tests of the attentional hypothesis that pictures can act as distractors in learning reading responses to words.

Braun (1969) questioned the effectiveness of presenting sight vocabulary with illustrations, since a picture may compete with a word for the attention of the learner. In testing this hypothesis, he randomly assigned 240 kindergarteners either to the auditory treatment or the auditory-visual treatment. The auditory treatment involved presenting a word, saying the word aloud and having the subject repeat the verbal response. The auditory-visual treatment followed this same procedure and included a picture to accompany each word presentation. Results disclosed that boys and girls in the auditory treatment acquired the sight vocabulary significantly faster than did children in the auditory-visual treatment. However, differences in the mean retention scores favoring the auditory

treatment showed significance for boys only. On the basis of this evidence, Braun concluded that for retention the type of stimulus treatment has a greater effect on boys than on girls. As results indicated, the addition of pictures in the auditory-visual condition reduced the rate of learning for both high and low ability groups but appeared to be more pronounced with the low ability group. Braun accounted for this reduction in learning by suggesting that the visual cues acted as distracting stimuli.

In testing the use of pictures for teaching a sight vocabulary, Duell (1968) compared prompted and unprompted training methods. A word was prompted when it was paired with a picture representing the word. When a word was unprompted, it appeared alone. The subjects were 80 kindergarten children randomly drawn from three Midwestern schools. Children in the prompted training sequences, had to match a word and its picture with an identical word and picture. Children in the unprompted training sequences had to match a word and its picture with the correct word only. The mean percents of correct responses for each training condition indicated that the unprompted training sequences were superior to the prompted training sequences. Results from recall and matching posttests revealed that 40% of the words were learned in the unprompted training

group as compared with 11% in the prompted group. Duell explained that in the unprompted training sequence, the children were forced to attend to the words when responding, and therefore learned more words than the children in the prompted training group, who could depend on the picture cue for aid in responding.

An investigation was conducted to determine the effect of pictures and realia in the presentation of selected words on the learning rate of kindergarten boys and girls (Ollila & Olson, 1972). Each group of 25 girls and 25 boys from an upper-middle socioeconomic class were assigned to one of three different learning conditions: (1) word alone, (2) word-picture, (3) word-object. The four words to be learned were randomly presented until the words were mastered or 20 trials were completed. No significant differences were found between the three methods of presentation for the girls. Results also revealed that for the boys, the word alone method produced the most rapid learning rate. The examiners noted that the boys often divided their attention between the word and picture and the word and object during the word-picture and word-object presentations

Otto (1964) explains that one reason for the use of pictures in instructional materials is the assumption that pictures clarify verbal descriptions.

However, he continues, there is evidence that verbal and pictorial presentations of the same stimuli can evoke different responses. These responses may also be conflicting. Concerned with this evidence, Otto (1964) investigated the differences in the kinds of responses given to verbal and pictorial representations of nouns. Upon seeing pictures flashed on a screen, the 125 adults participating in the study, responded by writing a word to describe their sense impressions to each picture. Their responses were then categorized and compared with responses to verbal representations of the same stimuli, compiled previously by Underwood and Richardson (1956a, in Otto, 1964).

Otto found that the picture of an object and the word name of the same object may not elicit the same response. In fact, pictures may offer clues that tend to contradict verbal descriptions. In addition, it was shown that words more frequently evoked color and size responses than did pictures. Tactile responses were more frequently given when the stimuli were pictures rather than words. From these results, Otto concluded that certain kinds of concepts may be more readily obtained from pictures, and others may be learned best with words.

Seventy-four college students participated in a free association task in order to determine the

associative similarity between words and pictures (Deno, Johnson, & Jenkins, 1968). Upon seeing a word or picture stimulus on a screen, the subjects were asked to produce an association to the stimulus. Results of the experiment showed that in terms of associative meaning, a picture does not necessarily represent the same concept as a word.

Neither Positive Nor Negative Effects

Harris (1967) used 240 low socioeconomic children to study the rate of acquisition and retention of interest loaded words. The children were divided into high and low ability groups and were randomly assigned to one of two treatment groups: visual-auditory (no picture) and visual-visual-auditory (picture). Each child was taken individually and acquisition trials and test trials were alternated until mastery of the words was obtained or 15 testing cycles had been completed. Results disclosed that acquisition scores for subjects taught by the no-picture method were higher than subjects taught by the picture method. Retention of words learned was independent of the mode of presentation; only acquisition of the words seemed to be influenced by the way in which words were presented.

A study was designed to determine whether children who read a basal reader with illustrations

would have greater comprehension than children who read the same reader without pictures (Miller, 1938). The 600 first, second, and third-graders participating in the investigation were arranged in equal ability groups based on scores obtained on the Gates Primary Reading Test and the reading section of the Stanford Achievement Test for Primary Grades. After reading the stories both the picture group and no-picture group were given posttests involving sentence completion, sequencing of events, choosing the correct words and phrases spoken by the teacher, and crossing out the word which did not belong among a group of three words. Analysis of posttest results revealed that children who read without pictures understood what they read as well as the children who read the same material with the use of pictures.

In a series of experiments involving boys and girls between 15 and 19 years of age. Vernon (1953) found that the use of pictures had neither a positive nor a negative effect upon the understanding and recall of verbal material. The experimenter compared the scores of subjects based on the number of major points and details remembered immediately after reading articles with and without pictures. Although the pictures aided the older boys and girls in remembering particular facts demonstrated by the pictures, taken

as a whole, the illustrated versions were not remembered significantly better than those without pictures.

In two experiments using children 11 to 12 years of age, Vernon (1954) found similar results. Except for certain isolated items, which were recalled better when presented pictorially, the findings failed to demonstrate that pictures assisted in understanding or recalling the verbal text.

In order to replicate and extend a study conducted by Samuels (1967), Elman (1973) investigated the differences in effectiveness in teaching sight words to kindergarten children by using words only (no-picture group), words and simple pictures (simple-picture group), and words and complex pictures (complex-picture group). The 30 children participating in the study were randomly assigned to one of the three experimental conditions. During acquisition trials, the subjects in the no-picture condition gave significantly more correct responses than subjects in the no-picture group. Subjects in the complex-picture group also gave significantly more correct responses than subjects in the no-picture group. There were no significant differences in test trial and retention performance among the three treatment conditions.

Using a design and procedure similar to that of Samuels (1967), an investigation was conducted to

determine the effects of picture and no-picture conditions on word recognition by 61 first-graders and 64 third-graders (Cohen, 1974). Different reading material was used for each of the two grade levels. The subjects were divided on the basis of pretest scores and were randomly assigned to either a picture or no-picture condition. There were no significant differences in word recognition performance between picture and no-picture treatment conditions. The experimenter concluded from her findings that pictures are not necessarily a distracting element.

Summary

Pictures have been used in teaching sight words and other word recognition skills for many years. They are an important aspect of most primary basal readers. Reading authorities have advocated the use of pictures in teaching word recognition.

Meaningful associations may be established between printed words and pictures, which may gradually lead to recognition of a word alone. In addition, pictures contribute to the meaning of a story and help children to form mental pictures about what they read.

Research has shown that pictures aided in the acquisition of a sight word vocabulary. The superiority of pictorial over printed materials in paired associate

tasks has also been demonstrated. Positive effects of pictures in studies on prose learning have also been shown.

However, research has been contradictory as to the effects of pictures on word acquisition. Experimenters finding negative effects of pictures found them to be distracting to poorer readers by drawing attention away from the printed words. Results from one study showed that boys only learned words at a more rapid rate without the presence of pictures. When a picture was present, attention was divided between the word and the picture. Evidence was also found that verbal and pictorial presentations of the same stimuli may evoke different responses. Other investigations revealed no differences in reading performance between subjects reading material with or without the presence of pictures.

In light of the research and opposing views, further investigation concerning the value of using pictures in teaching reading is needed.

Context

Calfee (1975) discussed the redundancy of language, whereas most writing contains more letters and words than are actually necessary for communication. Sentence redundancy refers to the constraints

within a group of words that form a sentence. These constraints may be grammatical or semantic in nature. Sentence context is effective in word recognition accuracy, since the reader is able to identify a word using partial clues.

In discussing a complex model of the reading process, Smith (1971) explained that the fluent reader is able to use the redundancy of printed language in reading. He states that fluent readers use the orthographic, syntactic, and semantic redundancy in printed material in order to obtain immediate word and meaning identification. It is not possible to identify every letter or every word in order to gain meaning from a passage. This is true, since the identification of letters in words requires less visual information than identifying letters in isolation, and the identification of words in meaningful sequences requires less visual information than identifying words in unrelated sequences.

Goodman's (1967) position is similar to Smith's (1971). He describes reading as a psycholinguistic guessing game and claims the identification of all letters and words is not necessary for efficient reading. He suggests that the efficient reader has acquired the skill in choosing the fewest, most effective clues available to produce guesses as to what is coming up

next in material he is reading. The redundancy of language allows the reader to select partial information from the graphic, syntactic, and semantic cues, and to predict and anticipate on the basis of this information.

Contrary to these theories, is the focal attention hypothesis proposed by Samuels (1970), which contends that picture and context clues hinder the acquisition of reading responses. In initially teaching children to identify words, it is most effective to present the words in isolation, since it is essential to attend to the graphic stimuli of the words. By drawing attention away from the graphic stimuli present in the printed word, picture and context clues make the learner less efficient in acquiring reading responses.

Positive Effects

Tinker and McCullough (1962) pointed out that one of the most important aids to word recognition is the use of context clues derived from the meanings of known words in a sentence or paragraph. By limiting the number of words that will fit the meaning of a given sentence, the use of context may confirm recognition of a word originally learned as a whole or may be used to identify a new word already available in the

child's speaking vocabulary. Skill in the use of context clues to recognize words should be taught in beginning reading and continued throughout the grades.

Gray (1948) stated that in order to bring sight words to a level of instantaneous perception, the child must be given many opportunities to meet the words over and over in meaningful context. In learning a sight word or a meaning vocabulary, it is important to realize that word recognition is much more successful in context than in lists (Spache & Spache, 1973).

According to Smith (1963) children should be taught to recognize words (sight) in contextual settings since we read words embedded in context and not in lists. Durkin (1976) maintains that teaching the use of context will help children become independent readers capable of solving their own reading problems. Dulin (1970) states that every reader with knowledge of the English language makes some use of context in word recognition and comprehension. He also contends that direct and regular instruction in the use of context cues is necessary for young readers to become proficient in utilizing context cues.

When a difficult word is encountered during reading, a child may use the context clues available to make an intelligent guess as to what the word might be from the meaning of the selection (Russell, 1961).

The use of context clues should be taught, since it is valuable and places continued emphasis on reading for meaning.

Several studies have demonstrated the positive effects of using context cues in teaching reading.

An experimental study was conducted with 100 children in grades 1, 2, and 3 attending a school in a suburb of Detroit (Goodman, 1965). Each subject was taken individually and asked to read a list of words on his or her approximate level of ability. The child was then asked to read orally from a book a story on which his word list was based. The experimenter expected the children to read many words in stories which they could not recognize in lists. The results demonstrated that contextual constraints facilitated the identification of words the children could not recognize when the words were presented in isolation; the children were able to read many more words in context which they could not read from the lists. Goodman explained that the syntactic and semantic constraints of sentences provided additional cues for anticipating unknown words. Therefore, he believes it is not desirable to present words out of context before introducing new stories.

In order to provide insight into the strategies that readers bring to the reading task, an analysis of

the oral reading errors made by 21 first-grade children attending the Ithaca New York City School was reported (Weber, 1970). On the syntactic level, judgments of grammatical acceptability showed that the subjects made responses that conformed to the constraints of preceding grammatical context. This demonstrated that both strong and weak readers brought their knowledge of linguistic structure to aid them in identifying words. Many of these responses were also semantically appropriate which showed that the children transferred their ability for handling spoken language to the reading task.

In an attempt to study the differences in reading strategy between good, average, and poor readers, the oral reading errors of 30 third-grade children were analyzed (Coomber, 1972). The graphic-phonetic appropriateness of reading errors to their printed stimuli were studied. In addition, the syntactic appropriateness of errors was measured by evaluating the appropriateness of the errors to sentences in which they occurred and by analyzing the position of errors in phrases. Differences between the readers of different levels of reading proficiency were found on the graphic-phonetic level. On the syntactic level, a high sensitivity to sentence structure was shown by all levels of reading proficiency.

An equally important use of context clues is that they provide the reader with feedback and act as a check on the application of other word recognition techniques (Bond & Tinker, 1973). Once a word has been figured out, the reader must be aware of whether the word makes sense in the context of the sentence.

The hypothesis that providing contextual information enables the reader to correct more of his identification errors by utilizing context cues as a feedback mechanism was tested (Steiner, Weiner, & Cromer, 1971). Twenty-four poor readers and 24 good readers in the fifth grade of a New England public school system participated in the study. The experiment also tested the effect of providing contextual information under the condition of a paragraph presentation and a single word presentation. Findings indicated that the poor readers showed no improvement in identification after being given contextual information. While the good readers demonstrated their ability to utilize syntactic and contextual cues in the material, the poor readers did not. According to the experimenters, the group of poor readers seemed to treat words as unrelated items in a series; although contextual cues were presented to them, they failed to use the cues in identifying words. The experimenters concluded that the poor readers did not utilize the

various cues available in their language while reading.

An experiment with 36 first-grade students and 36 third-grade students was conducted to examine the interaction effects of word frequency and contextual richness on word identification (Pearson & Studt, 1975). The subjects were asked to guess a word that fit into a blank space in sentences which varied in terms of contextual richness (rich, moderate, and poor). The third-grade subjects were instructed to read each sentence aloud; the experimenter read each sentence aloud for the first grade subjects. If a subject was unable to guess the correct word to fit in the missing blank in the sentence, the experimenter supplied an additional clue (a letter from the target word) each time an incorrect guess was made. Results of the study indicated that the three factors of grade, context, and frequency affect word identification. An increase in the ability to use context as a function of age was shown by the fact that the third grade subjects were able to identify the target words, especially those of high-frequency, with fewer visual cues than the first grade subjects. However, both groups demonstrated their ability to use language features in reducing uncertainty in order to identify words.

In two experiments a word boundary task required 39 fourth grade students and 41 sixth-grade students

from a metropolitan Detroit elementary school to make word identification decisions both with and without contextual information (Klein, Klein, & Bertino, 1974). Although the fourth-grade students showed small context use effects, context was utilized effectively by the sixth-grade students.

Forty girls and 26 boys between the ages of 8 and 10 participated in a study investigating the information and strategies available to a child when he uses context to complete a cloze test in reading and listening (Neville & Pugh, 1974). The subjects were divided into two groups and were given two parallel close tests of reading comprehension. Each group received different parallel forms of the test in each of the language modes. The scores for the listening tests for both groups were significantly lower than the reading scores. However, it was shown that the children used contextual information in choosing words for both the listening and reading tests. In discussing their results, the experimenters noted that during the reading test, subjects were able to use subsequent reading information to help them in completing an earlier blank. Since this was not possible during the listening test, it would be more difficult to fill in a test blank at the beginning of a sentence during the listening test than during the reading test. When the children had

sufficient information from the context, they chose words for the blanks which were syntactically and semantically appropriate.

Forty upper division college women participated in a study designed to test how horizontal and vertical constraints affect the word a subject will supply from his own repertoire (Weaver, Kingston, & Dinnan, 1970-71). Horizontal constraints were defined as being sequential-syntactic relationships of words in a sentence; whereas vertical constraints were the associational relationships operating over the distribution of words occurring at a particular deletion in a sentence. The subjects were administered 10 sentences. In each sentence a word was deleted, and the subjects were asked to supply all the words they could think of that made sense in the underlined blank space in each sentence. Results from the study indicated that the skilled reader does receive information from the constraints of the sentences he reads.

Attempting to discover if the addition of context is a significant aid to the learning and retention of words, 159 fourth, fifth, and sixth grade students participated in a study (Wallace, 1972). Thirty nonsense word forms, with and without the aid of context were presented tothe subjects to be learned in two parts. Results of tests for retention administered 24 hours

after initial exposure, demonstrated the superiority of list plus context over list without context. Although the girls were least affected by the presence or absence of context, the boys made significantly higher scores on word forms that had been presented with context than on those presented without context.

A study involving 26 children enrolled in New York public school classes for the retarded and 24 first-grade children attending regular classes dealt with the differential effects of context on the performance of retarded children and normal children reading at the first-grade level (Levitt, 1970). The children were asked to read a primary level story and a list of words from the story. Results indicated that the presence of context produced significant improvement in the reading performance of both the mentally retarded and the normal subjects. The facilitation of word recognition by context was not significantly greater for the normal subjects.

Harris (1970) used 60 mentally retarded children and 60 normal children in an investigation of the use of context in reading (Hargis, 1970). Fifteen subjects from each category were randomly assigned to one of four experimental groups. The first group received material treated with the cloze procedure with every 5th word deleted. They were asked to read the material

and fill in the missing blanks. The second group received material treated with the cloze procedure with every 5th word deleted. They were instructed to read the passage, but were not asked to fill in the blank spaces. The third group received material in which every 5th word was replaced with a standard size nonsense syllable. The fourth group was asked to read an unaltered passage. Reading comprehension was measured for all four groups by asking questions orally. Each subject received a passage that was equivalent to his or her identified instructional level. Results from the study indicated that the retarded subjects had a significant deficiency in their ability to use context in reading. In comparing normal and retarded subjects on their ability to use context to supply deleted words, the finding showed that their responses tended to be a function of intelligence. There were no significant differences between reading comprehension scores on the passages treated with the cloze procedure and the unaltered passages.

In a similar study designed to compare the ability of mentally retarded and nonretarded children in using context cues in reading, the subjects were 15 mentally retarded children and 15 nonretarded children (Hargis, 1972). After determining individual instructional reading levels using an informal reading

survey, each child was given a passage to read at his or her own instructional reading level. Each passage was treated with the cloze procedure with every fifth word deleted. The subjects were asked to read the passage and fill in the missing words in the blank spaces. The nonretarded subjects showed significantly greater ability to use context in supplying synonymous grammatically correct responses in the cloze tests. Hargis noted from the results that the ability to use the context in reading may be a function of intelligence.

On the basis of results from a two stage study on the ability to use specific context cues, Dulin (1969) concluded that general intelligence, verbal abilities, reading vocabulary and comprehension ability appear to be closely related to the ability to use context cues in reading.

A study was designed to determine whether mentally retarded readers use context cues beyond a sentence in order to complete blanks in a cloze test (Ramanduskas, 1972). Cloze selections were prepared from stories in a second reader of second grade. The material was presented to the 58 retarded students in two different ways: (1) sentences appearing in their natural order of discourse, (2) sentences rearranged randomly. The results of the study indicated that a

significantly greater number of correct cloze responses were given when the material presented contained sentences having a natural order of discourse. From these results the experimenter concluded that the retarded students were able to make use of context cues beyond a sentence.

Three experiments were conducted to evaluate the hypothesis that an increase in the length of context will increase the amount of relevant information about the target word if the context is congruous with the target word (Tulving & Gold, 1963). However, if the context is incongruous with the target word, then an increase in the length of the context would decrease the amount of relevant information and increase the recognition threshold for the tachistoscopically shown target word. Recognition thresholds for target words were correlated with measures of information content and degree of congruity of their contexts. The experiments demonstrated the facilatory effect of contextual information on identifying tachistoscopically exposed words. The context allowed the reader to predict responses by narrowing down the items that could appropriately occur in a sentence slot. The reader can make the proper response with less information than would be necessary if the word stood in isolation. The results also showed, however, that it is not simply the

length of the context or the amount of information in the context that determines the ease of tachistoscopic recognition of a target word, but rather the amount of relevant information the context provides. Contextual information lowered the threshold exposure when the context was congruent, but raised the threshold exposure when the context was incongruent or conflicting.

In an experiment using 600 college students as subjects, MacGinite (1961) compared the restorations of words which were omitted in different patterns from two English prose paragraphs. Results demonstrated that when every third word was omitted, restoration was more difficult than when the 24th, 12th, or 6th word were omitted from the passage. It was also shown that restoration of words omitted in groups of four was more difficult than restoration of words omitted in pairs. The omission of an adjacent word made restoration more difficult whether it preceded or followed an omitted word. According to MacGinitie, the data showed that the effect of context in restoring words is limited depending on the length of units omitted. When small segments are omitted, it is possible to gain understanding of the message and restore words with accuracy.

During word association training, pairs of words were learned by 44 first-graders (Samuels, 1966). Results of the study demonstrated that learning to read

new words was facilitated when the sequence of words matched the child's word associations. In another experiment, Samuels (1969) hypothesized that when words highly associated appear together in printed text, reading the first word will elicit an associate of that word. If the associate elicited by the first word matches the second word, then speed of word recognition should be facilitated. He further explained that when highly associated words appear sequentially in text, the reader may correctly report the second word after reading the first. On the other hand, if the associate elicited by the first word does not match the second word, additional time is required to report the second word correctly. An experiment using 20 college students under five treatment conditions was conducted to test this hypothesis. The results of the study supported the hypothesis; word recognition speed was facilitated when associative connections between words in text matched the word associations of the reader.

In testing the same hypothesis that recognition of a given word is faster when preceded by an associate and slower when preceded by a nonassociate with children, Samuels (1970) employed 20 fourth graders under five treatment conditions. Results disclosed that all treatments in which the target word was preceded by an associate were recognized significantly

faster than treatments in which the target word was preceded by a nonassociate.

Two experiments were conducted to investigate the use of contextual information for facilitating word prediction in a visual task (Klein & Kelin, 1973). Forty-eight undergraduate student volunteers at Oakland University participated in the first experiment. Seventy-two undergraduate students participated in the second experiment. The subjects were asked to identify word units within broken strings of letters that varied in contextual structure. The results of the two experiments demonstrated the use of contextual cues in increasing the speed and accuracy of visual word identification. As semantic and syntactic structure were added to the passages, significant increases in scores on the word boundary task were obtained. The experimenters suggested that the results supported a model of word recognition presented by Smith (1971).

Attempting to extend a recent study by Cleary, 51 high school students were presented with three sets of words, in which the vowels were deleted (Fusaro, Carroll, & Kimble, 1978). The students were asked to write the word they thought each consonant group represented. One set presented the 25 target words with vowels deleted in list form. A second set consisted of six sentences with vowels deleted from all

words including the 25 target words. A third set consisted of six sentences containing the 25 target words with vowels deleted only from the target words. The three sets were presented to each group of 17 subjects in a different order. The results demonstrated that the subjects had the lowest mean score on the treatment administered last. In each instance, learning occurred in the first treatment using a sentence context. In view of the findings the researchers concluded that the teaching of reading should aim at teaching students to increase their use of syntactic and semantic cues, since it was shown that the use of syntactic and semantic context improves the perception of words, even when faced with reduced graphic cues.

Allen (1972) identified three sources of information available to the reader during the reading process: grapho-phonic, syntactic, and semantic information. He stressed the importance of helping children develop strategies in using all three cue systems during reading and pointed out that at the beginning reading stage, the use of graphic-phonic cues should not be emphasized over the use of syntactic and semantic cues.

Constance McCullough (1958) contended that direct teaching in the awareness and use of contextual aids is necessary and should be part of the

developmental reading program.

In an initial experiment, college freshman were asked to fill in blanks on a cloze test (Blumenfeld & Miller, 1966). Deletions of every fifth word were made in a series of graded passages from the McCall-Crabbs series. Results of the experiment showed that difficult passages contained many abstract nouns, nominalizations, and passive constructions. The second experiment involved the teaching of nominalization constructions and passive verb constructions in a short course on transformational grammar. Significant improvement on a reading test was shown by students in the experimental group who had been given the course. Results of the experiments pointed out that complex, grammatical constraints which exist in our language appear to affect reading ability. Through the teaching of grammatical constraints and relationships, improvement in reading ability can be achieved.

A study was conducted in order to investigate the sensitivity of intermediate grade pupils to contextual clues described by Ames (1965) Classification Schema of Contextual Aids (Rankin & Overholser, 1969). The 208 intermediate grade students were administered an objective context test constructed using the cloze procedure. Ten items for every clue category were included on the test providing a total of 130 items on

the context test. Results of the study indicated that the subjects were able to respond adequately to certain types of clues but not to others. It was also demonstrated that reading ability was substantially predictive of the ability to use each of the 13 clues. It was suggested that further research be conducted in order to learn more about techniques for teaching children to utilize specific contextual clues.

Negative Effects

A study was conducted to determine the effect of presenting four artificially printed words in four different ways on the acquisition of reading responses (Singer, Samuels, & Spiroff, 1973-74). The four conditions included presenting the word alone, with a picture, within a sentence, or in a combination of a sentence plus a picture. The subjects involved in the study were 164 first and second grade children from a metropolitan school system. Study and test trials for each treatment were alternated for a maximum of 12 trials. Results of trials to criterion and correct responses during test trials showed that the subjects scored best on word alone, next on word plus picture, third on word plus sentence, and worst on word plus sentence and picture.

The results of the experiment supported Samuels' focal attention hypothesis which states that picture and

context clues hinder the acquisition of reading responses by acting as distracting stimuli. The experimenters claimed that the most effective method of initially teaching children to identify words is the presentation of words in isolation. It is essential for the early reader to attend to the graphic stimuli in the printed word. Picture and context cues may make the learner less efficient in acquiring reading responses because the student relies on picture cues and context cues in giving the correct responses without having to visually attend to the graphemes in the word.

Using a matching task and/or an associative learning task, eight groups of kindergarten children were taught to discriminate position and order differences in verbal and nonverbal item sequences (Koehler, 1971). The tasks involved training procedures to develop attention to letter cues in words, sight learning of words contrasting as pairs in letter order and position, and sight learning of words presented either in sentence frames or in list format. Results showed little indication that item-sequence training improved learning of sight words. The results on grammatical context word learning failed to show that function words and content words were aided by sentence practice. However, additional sentence practice did show significant improvement in word learning. The

possibility that sentence training treatments used in the study were inadequately designed was pointed out by the experimenter. In view of the results, the experimenter suggested that words be learned in a list prior to providing practice in sentences, since as he explains, mastery of a sentence does not produce complete learning of individual words.

Groff (1976) discussed limitations in the use of context cues by beginning readers. He pointed out that since immature readers often read word by word, they avoid cues to word recognition offered by the sentence context. Many facets of English grammar may hinder the use of context cues, especially if the written syntax differs from a child's spoken language. Groff substantiated his views of the limited value of context for beginning readers by reviewing evidence from studies such as Biemiller's (1970) study, which indicated that an early use of context by beginning readers may lead to an undesirable dependence on context and hinder overall reading growth.

A study of oral reading errors was designed to investigate changes in the use of contextual information and graphic information for word identification by children learning to read (Biemiller, 1970). Errors made by 42 children in two first-grade classes were analyzed. Nonresponse errors were also studied. In

the first phase, a predominant use of contextual information was identified. The second phase indicated a predominance of nonresponses errors and a significant increase of graphically constrained errors. The third phase showed an increase in the cooccurrence of graphic and contextual constraints. In discussing the results, the experimenter explained that in the first phase of reading development the use of graphic information in identifying words appeared to be minimal. Instead children in this phase seemed to try to use information they had obtained aurally in identifying words. It was also shown by the data that the longer a child stayed in the early, context phase without showing an increase in the use of graphic information, the poorer the reader he was at the end of the year. Therefore, the child's early use of contextual information did not appear to greatly facilitate progress in reading. Biemiller suggested that during early reading instruction teachers should provide situations without contextual information, in order to force children to pay attention to the graphic information available.

Neither Positive Nor Negative Effects

Hartley (1970) investigated the performance of first graders in learning minimal and maximal contrast word lists under three different conditions: (1)

presenting the words alone, (2) presenting the words with picture cues, (3) presenting the words with context cues. Each subject in each treatment group received alternating study trials and test trials until he had received 10 study and 10 test trials on each word list. The experimenter concluded from the results that it was not possible to state that one list type and treatment was superior to another. For most successful learning, it is necessary to consider which combination or list type and cue type should be used. For example, in using a graphic stimulus plus context cue to teach words, the results indicated that it was most successful to use maximal contrast word lists. If a graphic stimulus only is to be used in teaching words, the results showed that learning was most effective with minimal contrast lists.

An experiment was conducted in which a target sentence was shown following the presentation of a sentence context. In order to represent decreasing degrees of semantic content, the sentence contexts presented consisted of a one word context, a two word context, or no context at all (Dooling, 1972). In the first task the six male and six female students were asked to judge whether a sentence was meaningful or anomalous. The subjects were asked to judge whether or not the target sentence was appropriate for the

preceding context in the second task. Reaction times to comprehend the sentences were recorded. Results of the experiment demonstrated that context affected the comprehension process in opposing ways. The presence of context in Task 1 facilitated the reader by speeding up the comprehension process. The presence of context in Task 1 enabled the reader to reduce part of the semantic processing in understanding the meaning of a sentence. However, the presence of additional context in Task 2 slowed down part of the comprehension process, since additional processing time was required to comprehend a sentence in context than was required to comprehend a sentence isolation.

Four experiments were conducted in which college students read sentences after hearing different types of context about those sentences (Winter, 1974). The study was designed to determine whether context provides information about letters, words, or phrases which reduces the amount of time needed to identify those items during reading or whether those items may be skipped entirely. The study also tested whether or not context provides information leading to more accurate hypothesis-formation and more accurate identification of the largest manageable unit. The results of the experiments demonstrated that the context conditions did not significantly affect the

time needed to process the sentences.

Summary

As a whole the literature presented in this section has been very positive in regard to the effects of context on word recognition and reading. It was shown that the reader receives information from the syntactic and semantic constraints of a sentence. When given the opportunity, subjects in several studies chose words for missing blanks that were both syntactically and semantically appropriate. Since syntactic and semantic constraints provide cues for anticipating unknown words, the presence of context may improve word recognition. Subjects were able to read more words when presented in context than when the same words were presented in lists.

According to reading authorities teaching the use of context cues is essential and should be included in the developmental reading program. Studies demonstrated that the use of context cues can increase the speed and accuracy of word identification when the context provided is congruent. It was also shown that the addition of contextual information may slow down part of the comprehension process since more time is required to comprehend a sentence in context. It was also pointed out that context cues are helpful in

allowing the reader to check on his application of other word recognition techniques by acting as a feedback device.

In one study both retarded and nonretarded subjects were able to use context cues to increase word recognition. The greater ability of nonretarded subjects to use context effectively in two other studies suggests that the ability to use context may be a function of intelligence.

In one study poor readers were unable to utilize syntactic and semantic cues available to them. It was shown that early use of contextual information does not seem to aid the beginning reader in word recognition and reading. Two experimenters claimed that context cues may act as distracting stimuli by drawing attention away from the graphic stimuli present in a printed word. Does the ability to use context increase with age? Further research is needed to explore the early use of context and the use of context by poor readers.

Conclusion

The research concerning pictures and context cues in word recognition has provided valuable background information. In view of the controversial

research, the present study was designed to further explore the effect of pictures and context cues on the acquisition and retention of sight words.

CHAPTER III

PROCEDURES

In order to determine whether pictures and context cues act as distracting or facilitating stimuli in learning to read sight words, this study utilized a procedure similar to that of Singer, Samuels, and Spiroff (1973-74). Grades one and two were used in the study by Singer et al.; the sample for the present study were first graders only. A further difference was the use of different materials from those of Singer et al. The sight words used in this study were printed in the standard English alphabet. In the study by Singer et al. the four words learned were printed in an artificial alphabet. A test of retention was included in the present study. In addition, teacher and ability factors were considered in the design and analysis of data for the present study.

This chapter describes the subjects, materials, training and testing procedures, and analysis of data.

Subjects

The subjects were 48 first grade children selected from three heterogeneously grouped first grade classes at the Irene E. Feldkirchner Elementary

School in the township of Green Brook, New Jersey. Green Brook is an upper middle class community. The children were trained and tested during the tenth month of the school year.

Originally 52 subjects were chosen if they could not read at least four of the 20 words presented in the pretest. In order to include ability as a factor in the analysis, the subjects were then divided into high ability and low ability groups on the basis of composite scores on the Gates MacGinitie Reading Test. The median score was used as the dividing point to separate the children into high and low ability groups. Fortunately there were at least eight children below and eight children above the mediar in each class. The excess children in each class were eliminated randomly within the constraint of obtaining numbers of males and females in each condition that were as equal as possible. (Composite scores on the Gates MacGinitie Reading Test may be found in Appendix D.) Since it was desirable to include the teacher as a variable in the analysis, two subjects of high ability and two subjects of low ability from each classroom were randomly assigned to each of the four experimental conditions. Therefore, the children were balanced for ability and class with 12 children assigned to the no-picture group, 12 to the picture, 12 to the

sentence-no-picture, and 12 to the sentence plus picture group.

Materials

The pretest materials consisted of 20 5x8 inch unlined index cards with one of the following words typed on each card: megaphone, saxophone, stethoscope, clothespin, screw, hourglass, hydrant, mousetrap, spool, cigarette, penguin, octopus, faucet, snail, kangaroo, bugle, blouse, horseshoe, banjo, and dice. These 20 words were selected from a list of 94 words used in a study by Carroll and White (1973). The main reason for selecting the words from the Carroll and White study was because the mean reciprocal of latency for each word was provided in the data obtained from their study. This information supplied response times in naming pictures of objects. The 94 words were easily pictured nouns, and a black-on-white line drawing for each noun was available. In choosing the pool of 20 words for the present study, the following requirements were observed:

1. Words with low mean reciprocals of latency as given in Carroll and White (1973).

2. Words with low frequencies as presented by Carroll, Davies, and Richman (1971).

3. Words believed to be unfamiliar to first grade subjects. (Teachers of the students involved

in the study were asked to evaluate the list of 94 words on the basis of their instruction, observation, and experience in the classroom.) Information concerning the mean reciprocal of latency and frequency of each word may be found in Appendix E.

Twenty 5x8 inch unlined index cards were used as training stimuli for the picture group. Each card had a black-on-white line drawing of either a megaphone, saxophone, stethoscope, clothespin, screw, hourglass, hydrant, mousetrap, spool, cigarette, penguin, octopus, faucet, snail, kangaroo, bugle, blouse, horseshoe, banjo, or dice on it. The corresponding word was typed beneath each picture. Each subject in the picture group learned to read a different set of four words that were selected randomly from among those words the child could not read on the 20 word pretest.

Training stimuli for the word alone treatment consisted of 20 5x8 inch unlined index cards with the same 20 words used in the picture group, but without the pictures. Only one word was typed on each card. Each subject in the word alone group learned to read a different set of four words that were selected randomly from among those words the child could not read on the 20 word pretest.

Training stimuli for the sentence plus picture group consisted of 20 5x8 inch unlined index cards

with the same 20 pictures used in the picture group, but included a sentence using the word represented by the picture. The target group represented by the picture was underlined in each sentence. Only one sentence and one picture appeared on each card. Each subject in the sentence plus picture group learned to read a different set of four words that were selected randomly from among those words the child could not read on the 20 word pretest.

Training stimuli for the sentence-no-picture group had 20 5x8 inch unlined index cards with the same sentences used in the sentence plus picture group, but no pictures were included on the cards. Only one sentence appeared on each card; the target word was underlined in each sentence. Each subject in the sentence-no-picture treatment learned to read a different set of four words that were selected randomly from among those words the child could not read on the 20 word pretest.

The test stimuli for the four experimental groups consisted of 20 5x8 inch unlined index cards. Each card contained one word: either megaphone, saxophone, stethoscope, clothespin, screw, hourglass, hydrant, mousetrap, spool, cigarette, penguin, octopus, faucet, snail, kangaroo, bugle, blouse,

horseshoe, banjo, or dice typed at the bottom of the card. One word was presented on each card and no picture or context cues were provided. Each subject was tested on the same four words he or she was taught during the acquisition trials. A sample of training stimuli for each experimental condition may be found in Appendix F.

For each experimental condition, a set of four training cards was followed by a set of four test cards. The training and test cards for each condition were arranged in random orders.

Retention material for all four experimental conditions consisted of 20 5x8 inch unlined index cards. Each card contained one word: either megaphone, saxophone, stethoscope, clothespin, screw, hourglass, hydrant, mousetrap, horseshoe, banjo, or dice typed at the bottom of the card. One word was presented on each card and no pictures or context cues were provided. Each subject was tested on the same four words he or she was taught during acquisition trials.

Pretest Procedures

A pretest was administered to each subject individually in order to eliminate from the study those children who could already read the words.

The experimenter introduced the pretest by saying, "Today we are going to play a game. Let's see if you can read some words I will show you." The experimenter then presented the 20 words one at a time to each child. If a child was able to read all of the words, he was not included in the study. If a child was unable to read at least four of the 20 words, he was included in the study. Each subject included in the study was then randomly assigned four different words to be taught in the acquisition and test trials. It was essential that the experimenter assign to each subject four words that he or she was unable to identify in the pretest.

Acquisition Trials

Each child was taken individually. For the word alone group and the picture group the experimenter introduced the training procedures by saying, "Now let's see if we can learn some new words. I will show you a card with a word on it. I want you to read the word aloud to me. If you don't know the word the first time you see it, I will tell you what the word is. But you should try to read the word before I tell you. Each time you see a word, try to read it. Sometimes I will help you by telling you the word. Other times I will not give you help

because I want to see if you can read the word by yourself. Do you understand what to do?"

For the sentence-no-picture group and the sentence plus picture group the experimenter introduced the training procedures by saying, "Now let's see if we can learn some new words. I will show you a card with a sentence on it. There will be a word underlined in the sentence. I want you to read aloud the word that is underlined in each sentence. You may read the rest of the sentence to help you. If you don't know the word the first time you see it, I will tell you what it is. But you should try to read the word before I tell you. Sometimes I will help you by telling you the word. Other times I will not give you help because I want to see if you can read the word by yourself. Do you understand what to do?"

Each card was presented for 10 seconds. If the child did not correctly identify the word within the allotted time, the experimenter said the correct response as feedback for the child. During acquisition trials a correct response was recorded on a data sheet if the child said the word before the experimenter gave feedback.

Testing Procedures

Test Trials

In each experimental condition, throughout the study, each set of four acquisition cards was alternated with a set of four test cards. In addition each set of acquisition and test cards were presented in random orders. In the test trials, each test card was presented for 10 seconds. Words only were presented on the test cards for all four experimental conditions. If a child did not correctly identify the word in the allotted time, no feedback was given by the experimenter; the word was removed, and another word was presented. All responses were recorded on a data sheet.

If necessary, a maximum of 12 training trials and 12 test trials were given per word. However, once a word was correctly identified in the test trial, it was dropped from training trials, and the experimenter proceeded with training and test trials only for words not yet learned by the subject. Study-test procedures were stopped when the subject correctly identified the four words on the test trial.

Immediate Retention Test

After each child had successfully read each of his four words on the test trials, an immediate retention

test was given. The child was tested on the same four words he had learned during acquisition and test trials without the aid of pictures and context cues. Upon being shown the words one at a time, the child was asked to read the words. No feedback was given during the immediate retention test. Responses were recorded on a data sheet.

Delayed Retention Test

A delayed retention test was added to the procedures in the present study, which is an extension of the study by Singer et al. (1973-74). According to More (1969), in most educational situations, ". . . retention of what is learned is a primary objective of instruction and testing" (p. 341).

After each child has reached criterion and learned each of the four words presented in the acquisition and test trials and had been tested for immediate retention, he was retested again for retention of the words learned after approximately 24 hours. For the delayed retention test each child in the four experimental conditions was tested individually on the same four words he or she had been taught in the acquisition and test trials; no context cues or pictures appeared on the cards for the delayed retention test. Upon being shown the four words, one

at a time, the child was asked to read the words. No feedback was given during the delayed retention test. Responses were recorded on a data sheet.

Design and Data Analysis

The design of the study was a 2x2x2x3 block design for acquisition trials, immediate retention test, and delayed retention test. There were four conditions: word alone (absence of pictures, absence of context), picture (presence of pictures, absence of context), sentence-no-picture (absence of pictures, presence of context), and sentence plus picture (presence of pictures, presence of context). There were two ability levels of subjects involved in the study: children of high ability, children of low ability. The children were taken from three different self-contained classrooms--three teachers. Thus a total of 2x2x2x3 for each of the trials: acquisition trials, immediate retention test, delayed retention test. (See Figure 1.)

Data resulting from the study were analyzed by computing three separate analyses of variance: one for acquisition trials, one for number of words correct on the immediate retention test, and one for number of words correct on the delayed retention test.

Design shown was used for acquisition trials, immediate retention test and delayed retention test for each classroom teacher.

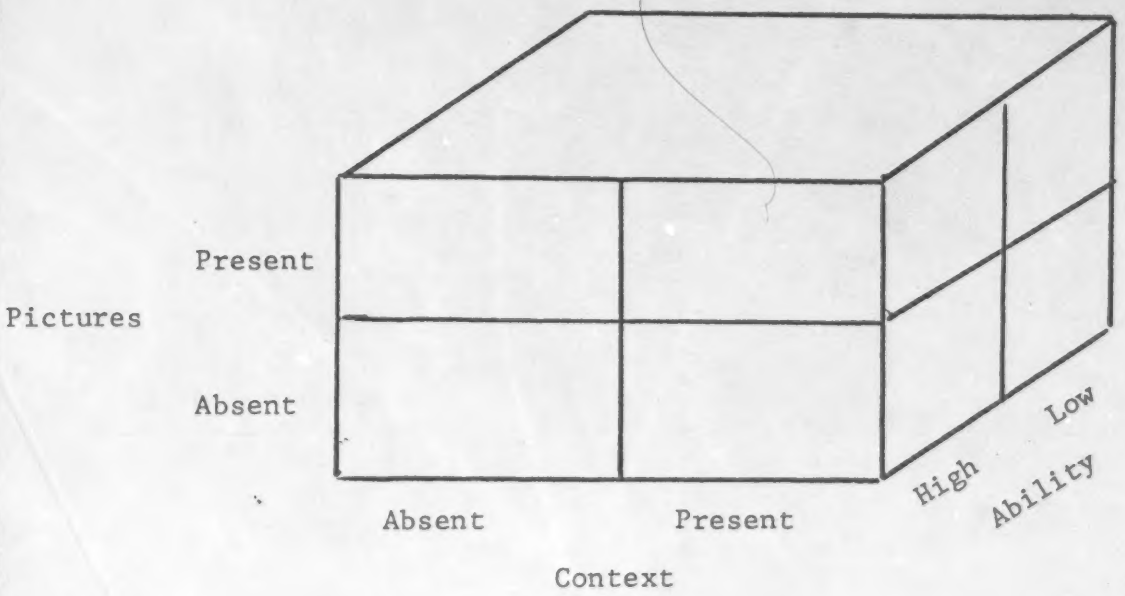

Figure 1. Design of Study

CHAPTER IV

RESULTS

Three separate four-way analyses of variance were computed: one for acquisition trials, one for the number of words correct on the immediate retention test, and one for the number of words correct on the delayed retention test. Each four-way analysis of variance included an analysis of the interaction of the following factors: teacher, pictures, context cues, and ability.

Table 1 shows the means and standard deviations for the total sample for combinations of pictures, context cues, and ability for acquisition trials, immediate retention test, and delayed retention test. Since no differences were found among teachers in the analyses of variance, the teacher variable was disregarded in the presentation and discussion of data.

In the analysis of variance for acquisition trials which included pictures, context, and ability level as variables, the only significant F found was for ability ($p \leq .05$). Children of high ability ($\bar{X}=1.062$) learned the words in fewer trials than children of low ability ($\bar{X}=1.260$).

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR COMBINATIONS OF PICTURES, CONTEXT CUES, AND ABILITY FOR ACQUISITION, IMMEDIATE RETENTION, AND DELAYED RETENTION

Treatment			Acquisition		Immediate		Delayed	
Pictures	Context	Ability	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Present	Present	High	1.08	.129	4.00	.00	4.00	.00
		Low	1.21	.188	4.00	.00	3.33	1.21
	Absent	High	1.00	.00	4.00	.00	4.00	.00
		Low	1.21	.188	4.00	.00	4.00	.00
Absent	Present	High	1.08	.129	4.00	.00	4.00	.00
		Low	1.12	.136	4.00	.00	3.83	.41
	Absent	High	1.08	.129	4.00	.00	4.00	.00
		Low	1.50	.612	4.00	.00	3.16	1.33

There were no significant differences among means for number of words correct on the immediate retention test. All children of all combinations of pictures, context, and ability responded perfectly, achieving a mean score of 4.00.

In the analysis of variance for the number of words correct on the delayed retention test, ability was found to be a significant factor ($p \leq .01$). The children of high ability ($\bar{X}=4.00$) had significantly more words correct on the delayed retention test than children of low ability ($\bar{X}=3.58$). Table 2 more clearly shows the differences between children of high and low ability.

In the analysis of variance for the number of words correct on the delayed retention test, the interaction of pictures, context, and ability was also significant ($p \leq .05$). This pattern was one of perfect retention by children of high ability for combinations of pictures and context ($\bar{X}=4.00$) with differences among combinations of pictures and context for children of low ability. The means for combinations of pictures and context for children of low ability were as follows: Children of low ability in the picture condition (pictures present, context absent) obtained a mean score of 4.00. Children of low ability in the sentence-no-picture condition (pictures absent, context

TABLE 2

SUMMARY OF ANALYSES OF VARIANCE FOR ACQUISITION AND DELAYED RETENTION

		Acquisition		Delayed Retention	
Source	df	MS	F	MS	F
P	1	.255	.67	.021	.33
C	1	.255	.67	.001	
A	1	1.880	4.94[a]	.521	8.33[b]
PC	1	.630	1.66	.333	5.33[a]
PA	1	.047	.12	.021	.33
CA	1	.630	1.66	.000	
PCA	1	.255	.67	.333	5.33[a]
S(TCPA)	24	.380		.062	

[a] $p \leq .05$

[b] $p \leq .01$

present) achieved a mean score of 3.83. A mean score of 3.33 words correct was achieved by the children of low ability in the sentence plus picture group (pictures present, context present). Children of low ability in the word alone condition (pictures absent, context absent) obtained a mean score of 3.16).

Although no statistical comparison was made between these mean scores in Table 1 among the four treatments for the low ability group, the pattern as a whole was found to be significant as presented in Table 2, for number of words correct on the delayed retention test. This pattern of interaction indicates that pictures were most effective when used alone without the presence of context. The data also suggests that context cues were helpful when pictures were not present; context cues appeared to hinder performance when the pictures were also present. The results also demonstrate that when pictures alone were used with words in the picture condition and when context cues alone were used in the sentence-no-picture treatment, a greater number of correct responses were made than when no pictures and no context cues were present in the word alone condition.

Since all children in all four treatments scored perfectly on the immediate retention test and no significant differences were found for combinations

of pictures, context, and ability, the analysis of variance for the immediate retention test was not included in Table 2.

Table 2 reveals the interaction of pictures and context for the delayed retention test which was found to be significant ($p \leq .05$). This interaction holds the same pattern previously discussed for the interaction of pictures, context, and ability on the delayed retention test, since the only differences found among the four treatments were for children of low ability; children of high ability responded perfectly on the delayed retention test across treatments.

CHAPTER V

DISCUSSION

The results of the study will be discussed in the following order: discussion of results and possible explanations for results; comparison of results in the present study to the study by Singer, Samuels, and Spiroff (1973-74); comparison of results to studies concerned with the effects of pictures; and comparison of results to studies concerned with the effect of context.

Discussion of Results and Possible Explanations for the Results

Acquisition Trials

The main question was to determine in which of the four conditions the subjects took the least number of trials to learn the four sight words. No significant differences were found among the four conditions on the acquisition trials. Therefore, pictures and context were neither facilitative nor distracting for word learning.

A second question was whether or not ability had an effect on the rate of word learning. Ability was a significant factor on the acquisition trials

with children of high ability learning the words in fewer trials than children of low ability. This finding was not surprising, since children of lower ability levels generally learn at a slower rate than children of higher ability levels.

Immediate Retention Test

The main question was concerned with which condition: word alone, picture, sentence-no-picture, or sentence plus picture produced more correct reading responses on the test of four sight words. A second question dealt with the effect of ability across the four conditions. No significant differences among conditions occurred for children of high and low ability. All children, both high and low ability, scored perfectly irrespective of condition on the immediate retention test.

The question arises as to how these results might be explained. One possible explanation is that the task itself was too easy. Had the words been printed in an artificial alphabet, the subjects would have had more difficulty learning the words. However, the experimenter used real words in order for the task to resemble as closely as possible a real-life situation.

The time when testing was done may also have contributed to the ceiling effects found. It is

doubtful that the same results would have occurred had the children been tested earlier in the school year when they were less knowledgeable.

The subjects were also too sophisticated for the task. Reading ability of the first graders participating in the present study was found to be average and above average when compared to national norms, as shown on the Gates-MacGinitie Reading Test. Differences among conditions might be found if the same experiment were to be conducted with subjects of below average reading ability. Subjects selected for the present study were from an upper-middle class community, which also may have influenced the findings.

It would be necessary to conduct the experiment using a greater number of words on children from diverse socioeconomic backgrounds.

Delayed Retention Test

The main question under consideration was which condition: word alone, picture, sentence-no-picture, or sentence plus picture yielded more correct reading responses upon testing for retention of the four sight words. A second question was concerned with the effect of ability across conditions. Ability was found to be a significant factor in that children of high ability had significantly more words correct on the delayed

retention test than children of low ability. No significant differences across treatments were found for children of high ability. However, for children of low ability, there was a significant picture by context interaction. For children of low ability, pictures were most effective when used alone without the presence of context. According to the data context cues were helpful when pictures were not present but appeared to hinder performance when pictures were also present. The children read more words correctly with pictures alone in the picture condition and with context cues alone in the sentence condition than when no pictures and no context cues were present in the word alone condition.

From the results it was shown that for children of high ability, all four conditions: word alone, picture, sentence-no-picture, and sentence plus picture were equally effective on the acquisition and retention of sight words. Subjects of low ability in the picture condition found pictures to be helpful. Low ability subjects in the sentence-no-picture group were aided by the presence of context. However, children of low ability in the sentence plus picture treatment found the combination of pictures and context cues to be distracting. In addition, low ability subjects in the word alone group (absence of pictures, absence of context) scored lowest on number of words correct on

the delayed retention test. Therefore, presenting words with pictures alone or with context cues alone, greater retention of words can be achieved than without the presence of pictures or context cues. On the other hand, too many cues (combinations of pictures and context) may distract the learner and hinder performance.

Comparison of Results from the Present Study to the Study by Singer, Samuels, and Spiroff (1973-74)

In the present study, a procedure similar to that of a study by Singer, Samuels, and Spiroff (1973-74) was used.

In the Singer et al. study the four conditions included presenting the word alone, with a picture, within a sentence, or in a combination of sentence plus picture. The words were printed in an artificial alphabet. First and second graders (N=164) from a metropolitan school system participated in the study. The experimenters alternated study-test trials for a maximum of 12 trials. Trials to criterion and number of correct responses during test trials showed that subjects scored best on word alone, next on word plus picture, third on word plus sentence, and worst on word plus sentence and picture.

The results of the experiment supported Samuels' focal attention hypothesis which states that pictures

and context cues hinder the acquisition of reading responses by acting as distracting stimuli. The experimenters claimed that the most effective method is to present words in isolation. Picture and context cues may make the learner less efficient in acquiring reading responses because the student relies on picture cues and context cues in giving the correct responses without having to attend visually to the graphemes in the word.

The results in the present study were substantially different from Singer et al. In the Singer et al. study subjects in the word-no-picture treatment took fewer trials to reach criterion than subjects in the other three treatments. In addition, for test trials, the word-no-picture condition had more correct responses than any of the other three groups. For acquisition trials and the number of words correct on the immediate retention test, results of the present study showed no significant differences among treatments. Ability was a significant factor for both acquisition trials and the delayed retention test in the present study. Children of low ability took significantly more trials to criterion than high ability children. Children of high ability had significantly more words correct on the delayed retention test than children of low ability. In the study by Singer et al., ability

was not considered to be a factor in their design and analysis of data.

Since a delayed retention test was not given in the study by Singer et al., it is not possible to make direct comparisons. However, the interaction for pictures and context cues for the delayed retention test for low ability children conflicts with results on test trials reported by Singer et al. This pattern of interaction indicates that pictures were most effective when used alone without the presence of context. Context cues were helpful when pictures were not present, but appeared to hinder performance when pictures were present.

In contrast to Singer et al., the present data showed that pictures and context cues do not necessarily act as distracting stimuli on the acquisition and retention of sight words. In fact, when pictures were used alone and context cues were used alone, they seemed helpful for low ability children.

To explain the differences between the two studies, the following factors must be considered:

1. Materials in the present study were meaningful whereas Singer et al. used an artificial alphabet. It is questionable whether Singer et al. are justified in generalizing their results to include words printed in standard English.

2. Sample in the present study consisted of a clearly defined upper-middle-class sample in terms of income level, housing, education, and occupation. Singer et al. provided no information regarding socio-economic status except that their subjects came from a metropolitan school system.

3. According to the Gates MacGinitie Reading Test subjects in the present study were average and above average in reading ability when compared to national norms. Singer et al. did not provide any information about reading level.

4. Factors of ability level and teacher were considered in the design and analysis of data for the present study. Factors of ability and teacher were not considered in the study by Singer et al.

5. An extension of the study by Singer et al. was made in the present study with the addition of the delayed retention test.

Comparison of Results to Studies Concerned with Effects of Pictures

In a study by King and Muehl (1965) results revealed that the picture method provided the most efficient learning with similar words and that the auditory method (absence of pictures) facilitated the learning of dissimilar words. Pictures had neither a positive nor a negative effect in learning dissimilar

words, but aided the beginning reader by providing additional cues when the words were similar. Similar and dissimilar words were not used in the present study. However, the finding that pictures had neither a positive nor negative effect on acquisition trials and immediate retention test is in agreement with the results from the study by King and Muehl.

Pictures were helpful in acquiring a sight word vocabulary in a study by Luyben and Brown (1973) with 27 rural emotionally and mentally retarded subjects. This finding agreed with the finding from the present study that pictures used alone without the presence of context were helpful to children of low ability on the delayed retention test.

In his laboratory experiment testing the effect of pictures on the acquisition of reading responses for first graders, Samuels (1967) found that during acquisition trials, children in the picture group gave significantly more correct responses than children in the no-picture group. In the present study, no significant differences were found among treatments. Samuels (1967) also found that during test trials when pictures were not present, children in the no-picture group gave significantly more correct responses. This finding was not supported by the present study, since no significant differences among treatments were found on

the immediate retention test. All children of all combinations of pictures and context scored perfectly on the immediate retention test.

In Experiment II by Samuels (1967), results disclosed that among poorer readers, children in the no-picture condition learned to read significantly more words than children in the picture condition. In contrast, the present study showed that on the delayed retention test, children of low ability in the picture condition achieved a perfect score as compared to children of low ability in the word alone condition who had the least number of words correct among the four treatments. Samuels also found no significant differences in words acquired between picture and no-picture condition for the better readers. This finding was supported by the present study which demonstrated that for acquisition trials, immediate retention test, and delayed retention test, no significant differences among treatments for children of high ability were revealed.

Results of Braun's (1969) study disclosed that boys and girls in the auditory treatment acquired the sight vocabulary significantly faster than did children in the auditory-visual treatment. This finding appeared to be more pronounced for children of low ability. Braun's contention was not substantiated by the present study, since no significant differences among

treatments were found on acquisition trials. However, in the present study, rate of learning was found to be significant for ability level; children of high ability learned words in fewer trials than children of low ability.

Findings from a study by Duell (1968) indicated that unprompted training sequences (absence of pictures) were superior to the prompted training sequences (presence of pictures). This finding was not revealed in the present study, since no differences among conditions were found on the acquisition trials. Data from Duell's study also demonstrated that on posttests a greater number of words were learned by children in the unprompted training sequences than by children in the prompted group. Since all children of all combinations of pictures and context scored perfectly and no significant differences among treatments were found on the immediate retention test, Duell's findings were not confirmed by the present study.

In a study by Harris (1967), acquisition scores for subjects in the no-picture method were higher than for subjects taught by the picture method. No differences among treatments were found on the acquisition trials and immediate retention tests in the present study. Harris discovered that retention of words learned was independent of the mode of

presentation. This finding was substantiated in the present study for children of high ability on the delayed retention test.

Elman (1973) found that during acquisition trials, children in the two picture groups gave significantly more correct responses than children in the no-picture group. No significant differences among treatments were revealed on the acquisition trials in the present study. On test trials and retention performance, Elman found no significant differences among the three treatment conditions. Similar findings were shown in the present study with no significant differences across treatments on the immediate retention test.

Cohen (1974) concluded that pictures are not necessarily a distracting element, since results of her study revealed no significant differences in word recognition performance between picture and no-picture treatment conditions. Results of the present study were in support of this finding, since no significant differences among treatments were found on the immediate retention test.

Comparison of Results to Studies Concerned with Effects of Context

Goodman (1965) demonstrated that contextual constraints facilitated the identification of words

the children could not recognize when the words were presented in isolation; the subjects were able to read more words in context which they could not read from lists.

In her study, Weber (1970) showed that both strong and weak readers brought their knowledge of linguistic structure to aid them in identifying words. Many of these responses were also semantically appropriate. Coomber (1972) discovered a high sensitivity to sentence structure by good, average, and poor readers.

Positive effects of context were shown in the above studies. These results were not fully confirmed by the present study, since no differences among treatments were found on acquisition trials, and the immediate retention test. For children of low ability context cues appeared to facilitate retention when no pictures were present, as shown on the delayed retention test.

Results of a study by Steiner, Weiner, and Cromer (1971) indicated that poor readers showed no improvement in identification of words after being given contextual information. While good readers demonstrated their ability to utilize syntactic and contextual cues in the material, the poor readers did not. Levitt (1970) found that the presence of context

produced significant improvement in the reading performance of both mentally retarded and normal subjects.

In studies by Hargis (1970) and Hargis (1972), the ability to use context effectively in supplying correct responses on cloze tests appeared to be a function of intelligence. Nonretarded subjects showed significantly greater ability in their use of context cues than did the retarded subjects.

The ability to use context cues was found to be a function of intelligence in three of the above studies. This finding was only partially supported in the present study; no differences were found among treatments for high and low ability groups on the acquisition trials and the immediate retention test. However, differences for the combination of pictures and context were found to be significant for children of low ability on the delayed retention test. The presence of context was helpful when pictures were not present, but appeared to hinder performance when pictures were present. Context cues alone produced a greater number of correct responses than the absence of context.

Neville and Pugh (1974) revealed that children used contextual information in choosing words for both listening and reading tests. Weaver, Kingston, and Dinnan (1970-71) found that the skilled reader does

receive information from the constraints of sentences read. Wallace (1972) demonstrated that boys made significantly higher scores on word forms that had been presented with context than those presented without context. Although these results showing positive effects of the use of context were not supported in the present study, they also were not disproved. Since no significant differences were found among treatments on acquisition trials and the immediate retention test, the effect of context was neither positive nor negative, as shown from results of the present study.

Results of a study by Tulving and Gold (1963) revealed that the amount of relevant information the context provides determines the ease of tachistoscopic recognition of a target word. Samuels (1969, 1970) showed that recognition of a given word is faster when preceded by an associate than when preceded by a non-associate. The present study was concerned with differences between conditions with and without the presence of context and not the degree of relevancy of the contextual information.

Fusaro, Carroll, and Kimble (1978) concluded from their findings that the teaching of reading should aim at teaching students to increase their use of syntactic and semantic cues. Blumenfeld and Miller (1966) found that complex, grammatical constraints

which exist in our language appear to affect reading ability. Through the teaching of grammatical constraints and relationships, improvement in reading ability can be achieved. No significant differences were found between conditions with or without the presence of context on acquisition trials and immediate retention test in the present study. However, on the delayed retention test the presence of context alone was helpful to students of low ability. Perhaps training in the use of context cues would increase reading ability.

In a study by Biemiller (1970) results indicated that an early use of context by beginning readers may lead to an undesirable dependence on context cues. Findings of the present study did not support Biemiller's results. In the present study, no significant differences among conditions were found on the acquisition trials and immediate retention tests. On the delayed retention test, context cues alone without the presence of pictures appeared to aid the students of low ability.

Hartley (1970) investigated the performance of first graders in learning words under three different conditions: word alone, word plus picture, word plus context cues. From her results, Hartley concluded that no one condition proved to be superior in learning the words over another. These findings were

confirmed by results of the present study, which showed no significant differences among conditions on the acquisition trials and the immediate retention test.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Summary

An investigation similar to that of Singer, Samuels, and Spiroff (1973-74) was conducted testing the effectiveness of pictures and context cues in teaching sight word vocabulary. Forty-eight first-graders from three classrooms at the Irene E. Feldkirchner Elementary School, an upper-middle-class suburban school in Green Brook, New Jersey, served as subjects in the tenth month of the school year. All children were individually pretested with 20 words. Children were included in the study if they could not read at least four of the 20 words presented in the pretest. A median level of composite scores (comprehension, vocabulary) from the Gates MacGinitie Reading Test was determined; the subjects were divided into high and low ability groups. The subjects were then assigned to one of four experimental conditions: word alone, picture, sentence-no-picture, and sentence plus picture. Two children of high ability and two children of low ability from each classroom were randomly assigned to each experimental condition.

Each subject was trained to read four words taken from the list of 20 words presented in the pretest. The word alone group saw words only; the picture group saw words and pictures; the sentence-no-picture group saw words embedded in the context of a sentence; and the sentence plus picture group saw words embedded in the context of a sentence with a picture. Using four different words which the child could not read as shown on the pretest, each subject received acquisition and test trials. An immediate retention test on the four words directly followed the acquisition and test trials. After 24 hours each subject was again tested on the four words learned during acquisition and test trials.

Three separate four-way analyses of variance were computed: one for acquisition trials, one for the number of words correct on the immediate retention test, and one for the number of words correct on the delayed retention test. In the analysis of variance for acquisition trials with pictures, context, and ability level as variables, the only significant F found was for ability ($p \leq .05$). Children of high ability ($\bar{X}=1.062$) learned the words in fewer trials than children of low ability ($\bar{X}=1.260$). There were no significant differences among means for number of words correct on the immediate retention test. All children of all

combinations of pictures, context, and ability responded perfectly, achieving a mean score of 4.00.

The analysis of variance for number of words correct on the delayed retention test revealed a significant picture by context by ability interaction. This pattern of interaction was one of perfect retention by children of high ability for combinations of pictures and context ($\bar{X}$=4.00) with differences among combinations of pictures and context for children of low ability. From this pattern it was demonstrated that for low ability children pictures were most effective when used alone without the presence of context; context cues were most helpful when pictures were not present. A greater number of correct responses were made when pictures alone were present and when context cues alone were present than when no pictures and no context cues were present.

Conclusions

Based on the findings of this study, the following conclusions may be drawn:

Since it was demonstrated that no significant differences among the four conditions: word alone, picture, sentence-no-picture, and sentence plus picture were found on the acquisition trials and the immediate retention test, the following statements can be made:

1. The use of pictures does not distract children from learning sight words.
2. The use of context cues does not distract children from learning sight words.
3. No one training method was superior over another for acquisition trials and immediate test trials. This implies that children may be taught sight words through the use of different methods.

On the delayed retention test for children of low ability only, the interaction of pictures and context cues was found to be significant. From this pattern of interaction the following conclusion may be drawn:

4. For children of low ability, the presence of context cues alone and the presence of pictures alone appeared to be more effective in learning the sight words than the absence of pictures and context cues.

Ability was a significant factor for acquisition trials and delayed retention test. Children of high ability took fewer trials to reach criterion than children of low ability and high ability children had significantly more words correct on the delayed retention test than did children of low ability. From these results we can conclude:

5. Rate of learning in the present study tended to be slower for children of low ability.
6. Retention of words was greater for children of high ability than for the children of low ability.

Suggestions for Further Research

1. Since this sample was generally one of average and above average ability and from an upper-middle-class background, it would be desirable to use the same methods and materials on subjects from diverse socioeconomic backgrounds with a greater range of abilities.

2. In order to obtain further knowledge of the effects of context as a function of age, there is a need to study its effects on the reading performance of students as they progress from one grade level to the next.

3. Since the ability to use context cues effectively in reading appears to depend on whether or not the contextual information available is relevant or irrelevant, further studies in this area which will rate the relevancy of contextual information should be conducted.

4. It was also shown in the literature that ability to use context cues in reading may be related to the sex of subjects involved in a particular study. Further investigations, which include the sex of subjects as a variable should be conducted.

5. It would be interesting to include the teacher as a factor in studies concerning the effects of context and pictures.

6. Because of the perfect scores obtained on the test of immediate retention in the present study, the task was probably too easy for the subjects involved in the study. A similar experiment should be conducted with the following changes:

   a. Subjects would be tested earlier in the school year.
   b. More difficult sight words would be used.
   c. The number of words learned should be increased.

7. Since differences were found on the delayed retention test for the present study, it would be of value to include an additional retention test after a delayed time period of approximately three weeks.

8. Since much of the literature indicates that the use of context does facilitate the reader, a study

should be conducted to investigate the effect of training in the use of context cues to increase reading performance.

9. Acquisition trials might be used as a basis for a learning rate test related to reaching achievement.

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APPENDIX A

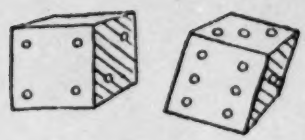
TWENTY WORDS USED IN THE STUDY

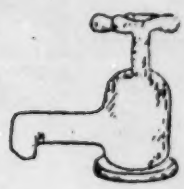
1. banjo
2. blouse
3. bugle
4. cigarette
5. clothespin
6. dice
7. faucet
8. horseshoe
9. hourglass
10. hydrant
11. kangaroo
12. megaphone
13. mousetrap
14. octopus
15. penguin
16. saxophone
17. screw
18. snail
19. spool
20. stethoscope

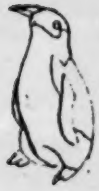
APPENDIX B

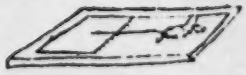
PICTURES USED IN PICTURE CONDITION

AND SENTENCE PLUS PICTURE CONDITION









APPENDIX C

SENTENCES USED IN SENTENCE-NO-PICTURE CONDITION AND SENTENCE PLUS PICTURE CONDITION

1. He can play the banjo.
2. She has on a pretty skirt and blouse.
3. Tom blew the bugle in the band.
4. The man is smoking a cigarette.
5. Jan hung up the shirt with a clothespin.
6. Jack will roll the dice to win the game.
7. The faucet began to drip.
8. My horse lost a horseshoe on the track.
9. Mother uses an hourglass to time the eggs.
10. The fireman put the hose on the fire hydrant.
11. A kangaroo jumps very fast.
12. The girls yelled into the megaphone at the game.
13. She will catch a mouse in the mousetrap.
14. The octopus uses its eight legs to get food.
15. A penguin is a bird that likes the cold.
16. Bob plays the saxophone very well.
17. You need a screw to fix this toy.
18. The snail moves very slowly.
19. Sue has a needle and a spool of thread.
20. A doctor can hear your heart with a stethoscope.

APPENDIX D

STANDARD SCORES (COMPOSITE SCORES FOR VOCABULARY AND COMPREHENSION) FROM THE GATES MacGINITIE READING TEST

Subject	Standard Score	Teacher
1.	67	3
2.	67	3
3.	67	3
4.	65.5	1
5.	64.5	3
6.	64.5	2
7.	64.5	1
8.	64.5	3
9.	64.5	2
10.	64.5	2
11.	64.5	2
12.	64.5	3
13.	64	1
14.	63.5	2
15.	63.5	2
16.	63.5	2
17.	63	2
18.	63	1

Subject	Standard Score	Teacher
19.	63	1
20.	62.5	1
21.	61.5	1
22.	61.5	1
23.	61.5	3
24.	61.5	3
25.	61	3
26.	61	1
27.	60.5	1
28.	60.5	2
29.	60	1
30.	59.5	1
31.	58.5	1
32.	58	1
33.	57.5	1
34.	56.5	3
35.	56.5	2
36.	56	3
37.	56	3
38.	55.5	2
39.	55.5	2
40.	55	3
41.	52	3
42.	51.5	3

Subject	Standard Score	Teacher
43.	51	2
44.	50	3
45.	48	1
46.	47.5	2
47.	47.5	2
48.	35.5	2

Subjects 1-24 were placed in the high ability level.

Subjects 25-48 were placed in the low ability level.

APPENDIX E

MEAN RECIPROCAL OF LATENCY AND FREQUENCY FOR EACH WORD USED IN THE STUDY

Word		Mean Reciprocal of Latency	U*
1.	banjo	1.247	2.5558
2.	blouse	1.225	3.9638
3.	bugle	1.223	6.0275
4.	cigarette	1.110	6.0408
5.	clothespin	.945	.2712
6.	dice	1.271	2.4748
7.	faucet	1.075	1.4748
8.	horseshoe	1.244	3.4265
9.	hourglass	1.010	.2496
10.	hydrant	1.011	.3834
11.	kangaroo	1.185	6.6414
12.	megaphone	.753	.6287
13.	mousetrap	1.063	.6853
14.	octopus	1.128	2.4430
15.	penguin	1.123	2.8597
16.	saxophone	.838	.7720
17.	screw	.945	7.7242

Word	Mean Reciprocal of Latency	U*
18. snail	1.181	6.7242
19. spool	1.069	2.7315
20. stethoscope	.872	.6809

*U=estimated frequency of occurrence per million words as presented by Carroll, Davies, & Richman (1971).

Mean reciprocal of latency for each word was obtained from the study by Carroll & White (1973).

APPENDIX F

SAMPLES OF TRAINING STIMULI USED IN EACH EXPERIMENTAL CONDITION

bugle

Word Alone Condition

---

bugle

Picture Condition

In the study a primary typewriter was used.

Tom blew the bugle in the band.

Sentence-No-Picture Condition

Tom blew the bugle in the band.

Sentence Plus Picture Condition

In the study a primary typewriter was used.